

**DRAFT ADDENDUM
AIR QUALITY MODELING REPORT
SNOWMOBILE AND SNOWCOACH EMISSIONS**

**WINTER USE PLAN
Environmental Impact Statement**

**YELLOWSTONE and GRAND TETON NATIONAL PARKS and the
JOHN D. ROCKEFELLER, JR., MEMORIAL PARKWAY**

Prepared for

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DRAFT Addendum
Air Quality Modeling Report
Winter Use Plan Environmental Impact Statement
Yellowstone and Grand Teton National Parks and the
John D. Rockefeller, Jr., Memorial Parkway

1.0 Introduction

In support of the Winter Use Plan Preliminary Draft Environmental Impact Statement (PDEIS) for Yellowstone National Park (Yellowstone), Grand Teton National Park (Grand Teton), and the John D. Rockefeller, Jr. Memorial Parkway (Parkway), Air Resource Specialists, Inc. (ARS) completed an analysis of potential air quality impacts from snowmobile and snowcoach operations. This addendum analyzes potential air quality impacts for several additional options utilizing air dispersion modeling and other accepted methods and models. Although the options are similar to preliminary alternatives previously modeled in the Air Quality Modeling Report, there are enough differences in the details to perform air quality modeling on all six (6) options. Oversnow motorized vehicle entry limits and other details for each of the options were provided by NPS to ARS and are included at the end of this addendum.

For this assessment of oversnow motorized vehicle emissions under the options, maximum predicted ambient concentrations of carbon monoxide (CO) and particulate matter (PM₁₀ and PM_{2.5}) were calculated using U.S. Environmental Protection Agency (EPA) approved air quality models. Impacts for each option were assessed with respect to the National Ambient Air Quality Standards (NAAQS) and relative to current and historical conditions. Modeling results were also compared to Prevention of Significant Deterioration (PSD) increments for particulate matter, and potential visibility impacts for each option were assessed. Winter-season emission estimates for criteria pollutants (CO, PM, and nitrogen oxides (NO_x)), hydrocarbons (HC), and hazardous air pollutants (HAPs) (benzene, 1,3 butadiene, formaldehyde, and acetaldehyde) were calculated. The methodology employed for the analyses presented in this addendum is discussed in the Air Quality Modeling Report and is also detailed in the Modeling Study Plan.

2.0 Dispersion Modeling Results

For all modeling results, the values shown are the highest predicted concentrations for each receptor location and include background levels. Tables 2-1 and 2-2 show the maximum predicted 1- and 8-hour average CO concentrations for each of the additional options at the analysis sites. The modeling results indicate that winter use vehicle emissions would not result in any exceedances of the CO NAAQS, or the Montana or Wyoming ambient air quality standards, under any of the options. Table 2-3 shows predicted 8-hour CO levels for the options as a percent of levels predicted under the 1999 Historical Conditions Scenario. Similarly, Table 2-4 shows predicted 8-hour CO as a percent of levels predicted under the Current Conditions Scenario. These percentages are based on total CO concentrations including the modeling and background values.

**Table 2-1
Maximum Predicted 1-hour CO Concentrations
(parts per million)**

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		1-hour (ppm)	1-hour (ppm)	1-hour (ppm)	1-hour (ppm)
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	6.4	1.1	0.9	5.3
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	6.4	1.1	0.8	5.5
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	6.1	1.0	0.8	4.6
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	6.1	1.0	0.7	4.8
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	5.7	0.9	0.7	4.0
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	5.7	0.9	0.6	4.3
Current Conditions	Current Conditions / Actual Use Scenario	3.7	0.7	0.4	1.8
1999 Historical	Historical Unregulated Scenario	23.7	21.0	1.7	8.7

Note:
NAAQS for CO are 35 and 9 parts per million (ppm), for the 1-hour and 8-hour averaging periods, respectively.

**Table 2-2
Maximum Predicted 8-hour CO Concentrations
(parts per million)**

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		8-hour (ppm)	8-hour (ppm)	8-hour (ppm)	8-hour (ppm)
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	2.1	0.4	0.5	2.4
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	2.1	0.4	0.4	2.4
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	2.0	0.4	0.4	2.1
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	2.0	0.4	0.4	2.1
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	1.9	0.4	0.4	1.8
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	1.9	0.4	0.3	1.9
Current Conditions	Current Conditions / Actual Use Scenario	1.2	0.3	0.3	0.9
1999 Historical	Historical Unregulated Scenario	7.4*	6.6	0.8	3.8

Note:
NAAQS for CO are 35 and 9 parts per million (ppm), for the 1-hour and 8-hour averaging periods, respectively.
*For actual historical unregulated conditions, Yellowstone recorded a 8-hour CO measurement of 8.9 ppm at the West Entrance air quality monitor in 1999.

**Table 2-3
Percent of Historical Conditions Concentration - 8-hour CO**

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		Percent Concentration of 1999 Historical Conditions			
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	28%	7%	57%	62%
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	28%	7%	50%	64%
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	27%	6%	52%	54%
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	27%	6%	46%	56%
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	25%	6%	47%	48%
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	25%	6%	42%	50%
Current Conditions	Current Conditions / Actual Use Scenario	17%	5%	31%	23%
1999 Historical	Historical Unregulated Scenario	100%	100%	100%	100%

Note:
Percentages determined using modeled concentrations, including background levels (0.15 parts per million for 8-hour CO).

**Table 2-4
Percent of Current Conditions Concentration - 8-hour CO**

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		Percent Concentration of Current Conditions			
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	168%	141%	180%	274%
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	168%	141%	159%	279%
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	160%	130%	164%	238%
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	160%	130%	145%	247%
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	150%	120%	149%	209%
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	150%	120%	132%	221%
Current Conditions	Current Conditions / Actual Use Scenario	100%	100%	100%	100%
1999 Historical	Historical Unregulated Scenario	602%	2163%	317%	438%

Note:
Percentages determined using modeled concentrations, including background levels (0.15 parts per million for 8-hour CO).

Table 2-5 shows the maximum predicted 24-hour PM_{2.5} concentrations for each of the options at the analysis sites. The modeling results indicate that no winter use vehicle emissions from any of the options would result in exceedances of the 24-hour PM_{2.5} or PM₁₀ NAAQS, or the Montana or Wyoming ambient air quality standards.

Table 2-6 shows predicted 24-hour PM_{2.5} levels for the options as a percent of levels predicted under the 1999 Historical Conditions Scenario. These percentages were determined including the appropriate background level. Similarly, Table 2-7 shows predicted 24-hour PM_{2.5} levels for the options as a percent of levels predicted under the Current Conditions Scenario.

Table 2-5
Maximum Predicted 24-hour PM_{2.5} Concentrations (micrograms per cubic meter)

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		24-hour (ug/m ³)	24-hour (ug/m ³)	24-hour (ug/m ³)	24-hour (ug/m ³)
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	9.4	2.8	2.7	4.7
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	9.4	2.8	2.7	4.7
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	9.0	2.8	2.7	4.4
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	9.0	2.8	2.6	4.4
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	8.6	2.8	2.6	4.1
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	8.6	2.8	2.6	4.2
Current Conditions	Current Conditions / Actual Use Scenario	6.1	2.8	2.5	3.1
1999 Historical	Historical Unregulated Scenario	193.9	42.6	6.2	25.1
Note: NAAQS for PM ₁₀ is 150 ug/m ³ and for PM _{2.5} is 65 ug/m ³ , for the 24-hour averaging period.					

Table 2-6
Percent of Historical Conditions Concentration - 24-hour PM_{2.5}

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		Percent Concentration of 1999 Historical Conditions			
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	5%	7%	44%	19%
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	5%	7%	43%	19%
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	5%	7%	43%	17%
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	5%	7%	43%	18%
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	4%	7%	43%	16%
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	4%	7%	42%	17%
Current Conditions	Current Conditions / Actual Use Scenario	3%	7%	40%	13%
1999 Historical	Historical Unregulated Scenario	100%	100%	100%	100%
Note: Percentages determined using modeled concentrations, including background levels.					

Table 2-7
Percent of Current Conditions Concentration - 24-hour PM_{2.5}

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		Percent Concentration of Current Conditions			
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	154%	100%	109%	149%
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	154%	100%	107%	150%
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	147%	100%	107%	139%
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	147%	100%	105%	141%
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	140%	100%	106%	131%
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	140%	100%	104%	134%
Current Conditions	Current Conditions / Actual Use Scenario	100%	100%	100%	100%
1999 Historical	Historical Unregulated Scenario	3183%	1515%	247%	799%

Note:
Percentages determined using modeled concentrations, including background levels.

Since Yellowstone and Grand Teton are Class I areas, PM₁₀ increment consumption under PSD was also assessed. For Class I areas, the PM₁₀ PSD increment is 8 micrograms per cubic meter, for the 24-hour averaging period, which EPA has determined is the small “allowable” incremental increase for PM₁₀ in these areas. This increment is evaluated in reference to the previously established (by Montana and Wyoming) baseline date of 1979 for Yellowstone (*Air Quality Concerns Related to Snowmobile Usage in National Parks*, National Park Service Air Resources Division, February 2000), which was used to determine baseline concentrations. This study employed only a screening level approach in comparing predicted PM₁₀ increments (no background contribution) with estimated 1979 baseline concentrations to determine the increment for the options.

The predicted 24-hour PM₁₀ increment consumption values based on the previously discussed particulate modeling results are shown in Table 2-8 for each of the options. There is no 24-hour PM₁₀ increment consumption for Sites 1, 2, and 3 compared to the baseline date, and all Site 4 results are lower than the PSD increment of 8 micrograms per cubic meter.

Table 2-8
24-hour PM₁₀ PSD Increment Consumption

Scenario	Description	Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful Staging Area	Site 4: Flagg Ranch Staging Area
		24-hour (ug/m ³)	24-hour (ug/m ³)	24-hour (ug/m ³)	24-hour (ug/m ³)
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	7.0	0.4	0.3	2.3
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	7.0	0.4	0.3	2.3
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	6.6	0.4	0.3	2.0
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	6.6	0.4	0.2	2.0
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	6.2	0.4	0.2	1.7
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	6.2	0.4	0.2	1.8
PSD Baseline Year	1979 Historical Conditions	42.5	8.9	0.7	2.0

Note:
Baseline Year concentrations are based on the ratio of 1979 to 1999 snowmobile levels at the modeling locations.
Class I PSD Increment for 24-hour average PM₁₀ is 8 ug/m³
As the methodology employed in this study is a screening-level analysis, it is not intended for regulatory purposes and does not constitute a regulatory PSD increment consumption analysis.

3.0 Emissions Inventory

An emissions inventory of snowmobiles and snowcoaches operating in Yellowstone, Grand Teton and the Parkway in tons per winter season was completed for each additional option, based on vehicle entry limits and other information (included with this addendum).

Estimates were prepared for criteria pollutants (CO, PM, and NO_x) and HC. The total maximum potential winter season emissions due to operations of snowmobiles and snowcoaches in the parks in tons per winter season are shown for each option in Table 3-1. An emissions inventory for HAPs was also completed for each option and is discussed below. Table 3-2 shows the contribution by vehicle type by percentage of the total season emissions for the options.

**Table 3-1
Park-wide Total Winter Season Mobile Source Emissions (Pounds per Day / Tons per Year)**

Scenario	Description	CO		HC		NOx		PM	
		lb/day	tpy	lb/day	tpy	lb/day	tpy	lb/day	tpy
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	3,869	174	350	16	963	43	6	0.3
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	4,122	185	377	17	1,024	46	6	0.3
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	3,445	155	309	14	859	39	5	0.2
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	3,681	166	334	15	915	41	6	0.2
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	2,984	134	271	12	741	33	4	0.2
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	3,199	144	294	13	792	36	5	0.2
Current Conditions	Current Conditions / Actual Use Scenario	2,523	114	188	8	362	16	2	0.1
1999 Historical*	Historical Unregulated Scenario	67,662	3,045	20,109	905	203	9	277	12.5

Note:

All Options and scenarios assume current snowmobile BAT, except:

- Historical Conditions, which assumes all uncontrolled 2-stroke.

* For comparison purposes, this scenario was also modeled for the year 2010. The winter season emissions would be as follows: CO - 1,124 tpy; HC - 341 tpy; NOx - 8 tpy; PM - 12 tpy.

2010 conditions assumes standard snowmobile replacement rates based on EPA's 2006 and 2010 emissions restrictions.

For all Options, Grassy Lake Road emissions from snowmobiles originating in Targhee NF assume 2007 engine mix; 20% uncontrolled 2-stroke, 70% modified & direct injection 2-stroke, and 10% 4-stroke. For Options X, Y, and Z, all Grassy Lake Road emissions assume this engine mix.

**Table 3-2
Percent Contribution by Vehicle Type to Total Scenario Emissions**

Scenario	Description	CO			HC			NOx			PM		
		Snowmobile	Snowcoach	On-road Vehicle									
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	82%	18%	na	95%	5%	na	79%	21%	na	84%	16%	na
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	83%	17%	na	95%	5%	na	80%	20%	na	85%	15%	na
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	81%	19%	na	94%	6%	na	78%	22%	na	83%	17%	na
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	81%	19%	na	95%	5%	na	78%	22%	na	84%	16%	na
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	82%	18%	na	95%	5%	na	79%	21%	na	84%	16%	na
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	82%	18%	na	95%	5%	na	79%	21%	na	85%	15%	na
Current Conditions	Current Conditions / Actual Use Scenario	47%	53%	na	70%	30%	na	77%	23%	na	86%	14%	na
1999 Historical	Historical Unregulated Scenario	96%	4%	na	99%	1%	na	30%	70%	na	100%	0%	na

Emissions of HAPs (benzene, 1,3 butadiene, formaldehyde, and acetaldehyde) occur in snowmobile and snowcoach emissions and are associated with incomplete fuel combustion. An emission inventory for these HAPs was completed based on HC speciation estimates and the total winter season HC emissions. Using the methodology described in the Air Quality Modeling Report, total winter season mobile source emissions of HAPs were estimated for the options and are summarized in Table 3-3.

Table 3-3
Park-wide Total Winter Season Mobile Sources HAPs Emissions
(Tons per Year)

Scenario	Description	Benzene (tpy)	1-3 Butadiene (tpy)	Formaldehyde (tpy)	Acetaldehyde (tpy)
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	0.42	0.00	0.43	0.17
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	0.45	0.00	0.47	0.18
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	0.37	0.00	0.38	0.15
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	0.40	0.00	0.41	0.16
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	0.32	0.00	0.34	0.13
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	0.35	0.00	0.36	0.14
Current Conditions	Current Conditions / Actual Use Scenario	0.24	0.01	0.21	0.08
1999 Historical	Historical Unregulated Scenario	5.95	1.02	6.12	4.25

Note:
2-stroke and 4-stroke snowmobile HAPs estimated as a fraction of measured HC emissions based on data reported in SwRI's *Laboratory Testing of Snowmobile Emissions*, Lela and White, July 2002.
Snowcoach and on-road vehicle HAPs estimated as a fraction of HC emissions based on MOBILE6 modeling of HC and air toxics emission factors for light- and heavy-duty vehicles.

4.0 Visibility

Yellowstone and Grand Teton are classified as Class I areas under the Federal Clean Air Act. As required by the visibility protection provision of the Clean Air Act, additional procedural requirements apply when a proposed source has the potential to impair visibility in a Class I area (40 CFR 52.27 (d)). Therefore, an analysis of anticipated visibility impacts resulting from on-snow vehicle emissions was conducted following procedures in the *Workbook for Plume Visual Impact Screening and Analysis*, EPA-450/4-88-015, 1992. The EPA model VISCREEN incorporates the methodology and was used to conduct a Level 1 screening analysis of potential visibility impacts. .

The results of the VISCREEN modeling are shown in Table 4-1. There were no potential localized, perceptible, visibility impairments predicted for the additional options at the screening locations.

**Table 4-1
Visibility Impairment**

Scenario	Description	Screening Criteria Exceedance			
		Site 1: West Entrance	Site 2: West Entrance to Madison	Site 3: Old Faithful	Site 4: Flagg Ranch
Option X	720/105; Exp. Clsr. Gibbon & East / GRTE 86	No	No	No	No
Option X1	720/105; East & Mad.- Norris Open / GRTE 140	No	No	No	No
Option Y	625/100; Exp. Clsr. Gibbon & East / GRTE 86	No	No	No	No
Option Y1	625/100; East & Mad.- Norris Open / GRTE 140	No	No	No	No
Option Z	540/83; Exp. Clsr Gibbon & East / GRTE 86	No	No	No	No
Option Z1	540/83; East & Mad.- Norris Open / GRTE 140	No	No	No	No
Current Conditions	Current Conditions / Actual Use Scenario	No	No	No	No
1999 Historical	Historical Unregulated Scenario	Yes	No	No	Yes

MOTORIZED OVERSNOW VEHICLE OPTIONS

Options for Winter Use Planning
 Yellowstone and Grand Teton National Parks
 John D. Rockefeller, Jr., Memorial Parkway
 07 May 2007

	Option X:	Option X1:	Option Y:	Option Y1:	Option Z:	Option Z1:
General Description		Same as Option X, except Sylvan Pass and Madison to Norris would be open and GRTE has larger snowmobile numbers		Same as Option Y, except Sylvan Pass and Madison to Norris would be open and GRTE has larger snowmobile numbers		Same as Option Z, except Sylvan Pass and Madison to Norris would be open and GRTE has larger snowmobile numbers
Daily Snowmobile Limits in Yellowstone National Park (YNP)	720 snowmobiles per day West - 400 South - 265 North - 35 East - 0 Old Faithful - 20 Cave Falls Road - 50 snowmobiles (no BAT or guiding)	720 snowmobiles per day West - 400 South - 220 North - 30 East - 40 Old Faithful - 30 Cave Falls Road - 50 snowmobiles (no BAT or guiding)	625 snowmobiles per day West - 350 South - 220 North - 35 East - 0 Old Faithful - 20 Cave Falls Road - 50 snowmobiles (no BAT or guiding)	625 snowmobiles per day West - 350 South - 180 North - 30 East - 40 Old Faithful - 25 Cave Falls Road - 50 snowmobiles (no BAT or guiding)	540 snowmobiles per day West - 300 South - 185 North - 35 East - 0 Old Faithful - 20 Cave Falls Road - 50 snowmobiles (no BAT or guiding)	540 snowmobiles per day West - 300 South - 150 North - 30 East - 40 Old Faithful - 20 Cave Falls Road - 50 snowmobiles (no BAT or guiding)
Daily Snowmobile Limits in Grand Teton National Park (GTNP) and the John D. Rockefeller, Jr., Parkway (the Parkway)	86 snowmobiles per day Grassy Lake Road: - 15 (modeled as 5 groups of 3) Continental Divide Snowmobile Trail (CDST) - 6 groups of 6 snowmobiles each Jackson Lake - 35 individuals, no group	140 snowmobiles per day Grassy Lake Road: - 50 Continental Divide Snowmobile Trail (CDST) - 50 Jackson Lake - 40 NOTE: modeled group size of 5 for GL Rd and CDST; individuals for JL. Same as for Alt. 1a	86 snowmobiles per day Grassy Lake Road: - 15 (modeled as 5 groups of 3) Continental Divide Snowmobile Trail (CDST) - 6 groups of 6 snowmobiles each Jackson Lake - 35 individuals, no group	140 snowmobiles per day Grassy Lake Road: - 50 Continental Divide Snowmobile Trail (CDST) - 50 Jackson Lake - 40 NOTE: modeled group size of 5 for GL Rd and CDST; individuals for JL. Same as for Alt. 1a	86 snowmobiles per day Grassy Lake Road: - 15 (modeled as 5 groups of 3) Continental Divide Snowmobile Trail (CDST) - 6 groups of 6 snowmobiles each Jackson Lake - 35 individuals, no group	140 snowmobiles per day Grassy Lake Road: - 50 Continental Divide Snowmobile Trail (CDST) - 50 Jackson Lake - 40 NOTE: modeled group size of 5 for GL Rd and CDST; individuals for JL. Same as for Alt. 1a
Snowmobile Guide Requirements	YNP: 100% commercially guided	Same as Option X	Same as Option X	Same as Option X	Same as Option X	Same as Option X

	Option X:	Option X1:	Option Y:	Option Y1:	Option Z:	Option Z1:
	GTNP and Parkway: Guides allowed, but not required					
Best Available Technology (BAT) Requirements for Snowmobiles	YNP: All BAT GTNP and Parkway: Grassy Lake Road: No BAT Requirements CDST and Jackson Lake: EPA Compliant (2007 or newer model year)	YNP: All BAT GTNP and Parkway: All BAT, except snowmobiles originating on Targhee National Forest (NF) using Grassy Lake Road	YNP: All BAT GTNP and Parkway: Grassy Lake Road: No BAT Requirements CDST and Jackson Lake: EPA Compliant (2007 or newer model year)	YNP: All BAT GTNP and Parkway: All BAT, except snowmobiles originating on Targhee National Forest (NF) using Grassy Lake Road	YNP: All BAT GTNP and Parkway: Grassy Lake Road: No BAT Requirements CDST and Jackson Lake: EPA Compliant (2007 or newer model year)	YNP: All BAT GTNP and Parkway: All BAT, except snowmobiles originating on Targhee NF using Grassy Lake Road
Maximum Group Size	8 with one guide; 17 with 2 guides	Same as Option X	Same as Option X	Same as Option X	Same as Option X	Same as Option X
Use of YNP Side Roads by Snowmobiles	Washburn Overlook and Freight Road: snowcoach only Firehole Canyon Drive, Canyon North Rim Drive and Riverside Drive: open in <u>afternoon</u> to snowmobiles Lake Butte and Canyon South Rim: open to snowmobiles Virginia Cascades: non-motorized only	Same as Option X	Same as Option X	Same as Option X	Same as Option X	Same as Option X
Daily Snowcoach Limits in YNP and Snowcoach BAT	105 snowcoaches per day West - 49 South - 19 North - 17 East - 0 Old Faithful/Parkwide - 20 All must meet	105 snowcoaches per day West - 49 South - 15 North - 4 East - 17 Old Faithful/Parkwide - 20 All must meet	100 coaches per day West - 45 South - 19 North - 17 East - 0 Old Faithful/Parkwide - 19	100 coaches per day West - 45 South - 15 North - 17 East - 4 Old Faithful/Parkwide - 19	83 snowcoaches per day West - 37 South - 12 North - 15 East - 0 Old Faithful/Parkwide - 19 All must meet	83 snowcoaches per day West - 37 South - 10 North - 15 East - 2 Old Faithful/Parkwide - 19 All must meet

	Option X:	Option X1:	Option Y:	Option Y1:	Option Z:	Option Z1:
	snowcoach BAT	snowcoach BAT	All must meet snowcoach BAT	All must meet snowcoach BAT	snowcoach BAT	snowcoach BAT
Road Grooming	Continue road grooming, except <u>Sylvan Pass</u> and <u>Madison to Norris</u> would be closed.	Continue road grooming.	Continue road grooming, except <u>Sylvan Pass</u> and <u>Madison to Norris</u> would be closed.	Continue road grooming	Continue road grooming, except <u>Sylvan Pass</u> and <u>Madison to Norris</u> would be closed.	Continue road grooming
Non-motorized Use in YNP (no changes planned for GTNP)	Allowed subject to Winter Severity Index; increased use on South and East entrance roads during spring shoulder season.	Same as for Option X	Same as for Option X	Same as for Option X	Same as for Option X	Same as for Option X
Estimated maximum number of daily vehicle passengers in YNP	Snowmobile passengers - 936 Snowcoach passengers - 840 Total – 1776	Same as Option X	Snowmobile passengers -813 Snowcoach passengers - 130 Total - 485	Same as Option Y	Snowmobile passengers - 702 Snowcoach passengers - 664 Total - 1366	Same as Option Z
Apparent source or status of Travel Factors	Partially Done May 22, 2006 travel factors for YELL have 680 snowmobiles and both segments closed in Alternative 1e (and 78 coaches) But modeled at 11 snowmobiles per group	Partially Done May 22, 2006 travel factors for both YELL and GRTE have correct snowmobiles, but only 78 coaches. YELL snowmobile allocations from same source. (Alternative 1a) 105 coach allocations developed for Scenarios E.1 and E.2 for February 24, 2006 travel factors (both roads open). Actual factors from 1a.	Same as Option X	Partially Done May 22, 2006 travel factors for both YELL and GRTE have correct number of snowmobiles and coaches (Modeling Alternative 5). But modeled at 11 snowmobiles per group	Same as Option X	Partially Done May 16, 2006 travel factors have YELL – 540 snowmobiles 83 coaches GRTE – 140 snowmobiles But snowmobiles modeled with improved BAT and modeled at 11 snowmobiles per group

	Option X:	Option X1:	Option Y:	Option Y1:	Option Z:	Option Z1:
		Modeled at correct group size.				

Note that historically, a peak of 2,140 visitors toured Yellowstone daily, and that currently, an average of 570 tour it daily.

Option X - 720 / 105 with experimental road closure in Gibbon Canyon and East Closed / GRTE - 86 snowmobiles

Snowmobiles	West Entrance 400		South Entrance 265		East Entrance 0		North Entrance 35		Old Faithful 20		Totals 720
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	20	0.03	7.95	0.1	0	1.85	64.75	0.15	3	95.7
West Entrance to Madison	1.8	720	0.1	26.5	0.1	0	0.02	0.7	0.3	6	753.2
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	20	0.03	7.95	0.2	0	1.25	43.75	0.15	3	74.7
Canyon Village to Fishing Bridge	0.05	20	0.37	98.05	1.4	0	0.85	29.75	1.25	25	172.8
Fishing Bridge to Lake Butte	0.02	8	0.05	13.25	1.6	0	0.02	0.7	0.02	0.4	22.35
Fishing Bridge to West Thumb	0.15	60	0.43	113.95	0.3	0	0.15	5.25	1.25	25	204.2
Madison to Old Faithful	1.8	720	0.5	132.5	0.1	0	0.02	0.7	0.4	8	861.2
Old Faithful to West Thumb	0.45	180	1.38	365.7	0.2	0	0.13	4.55	1.3	26	576.25
West Thumb to Flagg Ranch	0.1	40	1.75	463.75	0.1	0	0.02	0.7	0.05	1	505.45

Snowcoaches	West Entrance 49		South Entrance 19		East Entrance 0		North Entrance 17		Old Faithful 20		Totals 105
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	2.45	0.03	0.57	0.1	0	1.85	31.45	0.15	3	37.47
West Entrance to Madison	1.8	88.2	0.1	1.9	0.1	0	0.02	0.34	0.3	6	96.44
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	2.45	0.03	0.57	0.2	0	1.25	21.25	0.15	3	27.27
Canyon Village to Fishing Bridge	0.05	2.45	0.37	7.03	1.4	0	0.85	14.45	1.25	25	48.93
Fishing Bridge to Lake Butte	0.02	0.98	0.05	0.95	1.6	0	0.02	0.34	0	0	2.27
Fishing Bridge to West Thumb	0.15	7.35	0.43	8.17	0.3	0	0.15	2.55	1.25	25	43.07
Madison to Old Faithful	1.8	88.2	0.5	9.5	0.1	0	0.02	0.34	0.4	8	106.04
Old Faithful to West Thumb	0.45	22.05	1.38	26.22	0.2	0	0.13	2.21	1.3	26	76.48
West Thumb to Flagg Ranch	0.1	4.9	1.75	33.25	0.1	0	0.02	0.34	0.05	1	39.49

Snowmobiles	CDST 36		Grassy Lake Rd 15		Jackson Lake 35		Totals 86
GRTE Road Segment	Factor	Results	Factor	Results	Factor	Results	
Moran Junction to Flagg Ranch	2	72	0	0	0	0	72
Flagg Ranch west to boundary	0	0	1.9	28.5	0	0	28.5
Jackson Lake fishing access	0	0	0	0	2	70	70

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.

Option X1 - 720 / 105 with East and Madison to Norris Open / GRTE - 140 snowmobiles

Snowmobiles	West Entrance 400		South Entrance 220		East Entrance 40		North Entrance 30		Old Faithful 30		Totals 720
	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
YELL Road Segment											
Mammoth to Norris	0.05	20	0.03	6.6	0.1	4	1.8	54	0.3	9	93.6
West Entrance to Madison	1.8	720	0.05	11	0.1	4	0.15	4.5	0.15	4.5	744
Madison to Norris	0.59	236	0.08	17.6	0.1	4	1.2	36	1	30	323.6
Norris to Canyon Village	0.44	176	0.05	11	0.2	8	0.56	16.8	0.7	21	232.8
Canyon Village to Fishing Bridge	0.34	136	0.45	99	1.4	56	0.36	10.8	0.7	21	322.8
Fishing Bridge to East Entrance	0.02	8	0.05	11	1.6	64	0.02	0.6	0.02	0.6	84.2
Fishing Bridge to West Thumb	0.08	32	0.46	101.2	0.3	12	0.02	0.6	0.7	21	166.8
Madison to Old Faithful	1.41	564	0.47	103.4	0.1	4	1.15	34.5	1.05	31.5	737.4
Old Faithful to West Thumb	0.27	108	1.35	297	0.2	8	0.05	1.5	0.75	22.5	437
West Thumb to Flagg Ranch	0.05	20	1.75	385	0.1	4	0.05	1.5	0.05	1.5	412

Snowcoaches	West Entrance 49		South Entrance 15		East Entrance 4		North Entrance 17		Old Faithful 20		Totals 105
	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
YELL Road Segment											
Mammoth to Norris	0.05	2.45	0.03	0.45	0.1	0.4	1.8	30.6	0	0	33.9
West Entrance to Madison	1.8	88.2	0.05	0.75	0.1	0.4	0.15	2.55	0.48	9.6	101.5
Madison to Norris	0.59	28.91	0.08	1.2	0.1	0.4	1.2	20.4	0.06	1.2	52.11
Norris to Canyon Village	0.44	21.56	0.05	0.75	0.2	0.8	0.56	9.52	0.06	1.2	33.83
Canyon Village to Fishing Bridge	0.34	16.66	0.45	6.75	1.4	5.6	0.36	6.12	0.06	1.2	36.33
Fishing Bridge to East Entrance	0.02	0.98	0.05	0.75	1.6	6.4	0.02	0.34	0	0	8.47
Fishing Bridge to West Thumb	0.08	3.92	0.46	6.9	0.3	1.2	0.02	0.34	0.06	1.2	13.56
Madison to Old Faithful	1.41	69.09	0.47	7.05	0.1	0.4	1.15	19.55	0.6	12	108.09
Old Faithful to West Thumb	0.27	13.23	1.35	20.25	0.2	0.8	0.05	0.85	1.3	26	61.13
West Thumb to Flagg Ranch	0.05	2.45	1.75	26.25	0.1	0.4	0.05	0.85	1.18	23.6	53.55

Snowmobiles	CDST 50		Grassy Lake Rd 50		Jackson Lake 40		Totals 140
	Factor	Results	Factor	Results	Factor	Results	
GRTE Road Segment							
Moran Junction to Flagg Ranch	2	100	0	0	0	0	100
Flagg Ranch west to boundary	0	0	1.9	95	0	0	95
Jackson Lake fishing access	0	0	0	0	2	80	80

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.

Option Y - 625 / 100 with experimental road closure in Gibbon Canyon and East Closed / GRTE - 86 snowmobiles

Snowmobiles	West Entrance 350		South Entrance 220		East Entrance 0		North Entrance 35		Old Faithful 20		Totals 625
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	17.5	0.03	6.6	0.1	0	1.85	64.75	0.15	3	91.85
West Entrance to Madison	1.8	630	0.1	22	0.1	0	0.02	0.7	0.3	6	658.7
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	17.5	0.03	6.6	0.2	0	1.25	43.75	0.15	3	70.85
Canyon Village to Fishing Bridge	0.05	17.5	0.37	81.4	1.4	0	0.85	29.75	1.25	25	153.65
Fishing Bridge to Lake Butte	0.02	7	0.05	11	1.6	0	0.02	0.7	0.02	0.4	19.1
Fishing Bridge to West Thumb	0.15	52.5	0.43	94.6	0.3	0	0.15	5.25	1.25	25	177.35
Madison to Old Faithful	1.8	630	0.5	110	0.1	0	0.02	0.7	0.4	8	748.7
Old Faithful to West Thumb	0.45	157.5	1.38	303.6	0.2	0	0.13	4.55	1.3	26	491.65
West Thumb to Flagg Ranch	0.1	35	1.75	385	0.1	0	0.02	0.7	0.05	1	421.7

Snowcoaches	West Entrance 45		South Entrance 19		East Entrance 0		North Entrance 17		Old Faithful 19		Totals 100
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	2.25	0.03	0.57	0.1	0	1.85	31.45	0.15	2.85	37.12
West Entrance to Madison	1.8	81	0.1	1.9	0.1	0	0.02	0.34	0.3	5.7	88.94
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	2.25	0.03	0.57	0.2	0	1.25	21.25	0.15	2.85	26.92
Canyon Village to Fishing Bridge	0.05	2.25	0.37	7.03	1.4	0	0.85	14.45	1.25	23.75	47.48
Fishing Bridge to Lake Butte	0.02	0.9	0.05	0.95	1.6	0	0.02	0.34	0	0	2.19
Fishing Bridge to West Thumb	0.15	6.75	0.43	8.17	0.3	0	0.15	2.55	1.25	23.75	41.22
Madison to Old Faithful	1.8	81	0.5	9.5	0.1	0	0.02	0.34	0.4	7.6	98.44
Old Faithful to West Thumb	0.45	20.25	1.38	26.22	0.2	0	0.13	2.21	1.3	24.7	73.38
West Thumb to Flagg Ranch	0.1	4.5	1.75	33.25	0.1	0	0.02	0.34	0.05	0.95	39.04

Snowmobiles	CDST 36		Grassy Lake Rd 15		Jackson Lake 35		Totals 86
GRTE Road Segment	Factor	Results	Factor	Results	Factor	Results	
Moran Junction to Flagg Ranch	2	72	0	0	0	0	72
Flagg Ranch west to boundary	0	0	1.9	28.5	0	0	28.5
Jackson Lake fishing access	0	0	0	0	2	70	70

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.

Option Y1 - 625 / 100 with East and Madison to Norris Open / GRTE - 140 snowmobiles

Snowmobiles	West Entrance 350		South Entrance 180		East Entrance 40		North Entrance 30		Old Faithful 25		Total 625
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	17.5	0.03	5.4	0.1	4	1.8	54	0.3	7.5	88.4
West Entrance to Madison	1.8	630	0.05	9	0.1	4	0.15	4.5	0.15	3.75	651.25
Madison to Norris	0.59	206.5	0.08	14.4	0.1	4	1.2	36	1	25	285.9
Norris to Canyon Village	0.44	154	0.05	9	0.2	8	0.56	16.8	0.7	17.5	205.3
Canyon Village to Fishing Bridge	0.34	119	0.45	81	1.4	56	0.36	10.8	0.7	17.5	284.3
Fishing Bridge to East Entrance	0.02	7	0.05	9	1.6	64	0.02	0.6	0.02	0.5	81.1
Fishing Bridge to West Thumb	0.08	28	0.46	82.8	0.3	12	0.02	0.6	0.7	17.5	140.9
Madison to Old Faithful	1.41	493.5	0.47	84.6	0.1	4	1.15	34.5	1.05	26.25	642.85
Old Faithful to West Thumb	0.27	94.5	1.35	243	0.2	8	0.05	1.5	0.75	18.75	365.75
West Thumb to Flagg Ranch	0.05	17.5	1.75	315	0.1	4	0.05	1.5	0.05	1.25	339.25

Snowcoaches	West Entrance 45		South Entrance 15		East Entrance 4		North Entrance 17		Old Faithful 19		Total 100
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	2.25	0.03	0.45	0.1	0.4	1.8	30.6	0	0	33.7
West Entrance to Madison	1.8	81	0.05	0.75	0.1	0.4	0.15	2.55	0.48	9.12	93.82
Madison to Norris	0.59	26.55	0.08	1.2	0.1	0.4	1.2	20.4	0.06	1.14	49.69
Norris to Canyon Village	0.44	19.8	0.05	0.75	0.2	0.8	0.56	9.52	0.06	1.14	32.01
Canyon Village to Fishing Bridge	0.34	15.3	0.45	6.75	1.4	5.6	0.36	6.12	0.06	1.14	34.91
Fishing Bridge to East Entrance	0.02	0.9	0.05	0.75	1.6	6.4	0.02	0.34	0	0	8.39
Fishing Bridge to West Thumb	0.08	3.6	0.46	6.9	0.3	1.2	0.02	0.34	0.06	1.14	13.18
Madison to Old Faithful	1.41	63.45	0.47	7.05	0.1	0.4	1.15	19.55	0.6	11.4	101.85
Old Faithful to West Thumb	0.27	12.15	1.35	20.25	0.2	0.8	0.05	0.85	1.3	24.7	58.75
West Thumb to Flagg Ranch	0.05	2.25	1.75	26.25	0.1	0.4	0.05	0.85	1.18	22.42	52.17

Snowmobiles	CDST 50		Grassy Lake Rd 50		Jackson Lake 40		Totals 140
GRTE Road Segment	Factor	Results	Factor	Results	Factor	Results	
Moran Junction to Flagg Ranch	2	100	0	0	0	0	100
Flagg Ranch west to boundary	0	0	1.9	95	0	0	95
Jackson Lake fishing access	0	0	0	0	2	80	80

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.

Option Z - 540 / 83 with experimental road closure in Gibbon Canyon and East Closed / GRTE - 86 snowmobiles

Snowmobiles	West Entrance 300		South Entrance 185		East Entrance 0		North Entrance 35		Old Faithful 20		Totals 540
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	15	0.03	5.55	0.1	0	1.85	64.75	0.15	3	88.3
West Entrance to Madison	1.8	540	0.1	18.5	0.1	0	0.02	0.7	0.3	6	565.2
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	15	0.03	5.55	0.2	0	1.25	43.75	0.15	3	67.3
Canyon Village to Fishing Bridge	0.05	15	0.37	68.45	1.4	0	0.85	29.75	1.25	25	138.2
Fishing Bridge to Lake Butte	0.02	6	0.05	9.25	1.6	0	0.02	0.7	0.02	0.4	16.35
Fishing Bridge to West Thumb	0.15	45	0.43	79.55	0.3	0	0.15	5.25	1.25	25	154.8
Madison to Old Faithful	1.8	540	0.5	92.5	0.1	0	0.02	0.7	0.4	8	641.2
Old Faithful to West Thumb	0.45	135	1.38	255.3	0.2	0	0.13	4.55	1.3	26	420.85
West Thumb to Flagg Ranch	0.1	30	1.75	323.75	0.1	0	0.02	0.7	0.05	1	355.45

Snowcoaches	West Entrance 37		South Entrance 12		East Entrance 0		North Entrance 15		Old Faithful 19		Totals 83
YELL Road Segment	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
Mammoth to Norris	0.05	1.85	0.03	0.36	0.1	0	1.85	27.75	0.15	2.85	32.81
West Entrance to Madison	1.8	66.6	0.1	1.2	0.1	0	0.02	0.3	0.3	5.7	73.8
Madison to Norris	0	0	0	0	0	0	0	0	0	0	0
Norris to Canyon Village	0.05	1.85	0.03	0.36	0.2	0	1.25	18.75	0.15	2.85	23.81
Canyon Village to Fishing Bridge	0.05	1.85	0.37	4.44	1.4	0	0.85	12.75	1.25	23.75	42.79
Fishing Bridge to Lake Butte	0.02	0.74	0.05	0.6	1.6	0	0.02	0.3	0	0	1.64
Fishing Bridge to West Thumb	0.15	5.55	0.43	5.16	0.3	0	0.15	2.25	1.25	23.75	36.71
Madison to Old Faithful	1.8	66.6	0.5	6	0.1	0	0.02	0.3	0.4	7.6	80.5
Old Faithful to West Thumb	0.45	16.65	1.38	16.56	0.2	0	0.13	1.95	1.3	24.7	59.86
West Thumb to Flagg Ranch	0.1	3.7	1.75	21	0.1	0	0.02	0.3	0.05	0.95	25.95

Snowmobiles	CDST 36		Grassy Lake Rd 15		Jackson Lake 35		Totals 86
GRTE Road Segment	Factor	Results	Factor	Results	Factor	Results	
Moran Junction to Flagg Ranch	2	72	0	0	0	0	72
Flagg Ranch west to boundary	0	0	1.9	28.5	0	0	28.5
Jackson Lake fishing access	0	0	0	0	2	70	70

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.

Option Z1 - 540 / 83 with East and Madison to Norris Open / GRTE - 140 snowmobiles

Snowmobiles	West Entrance 300		South Entrance 150		East Entrance 40		North Entrance 30		Old Faithful 20		Total 540
	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
YELL Road Segment											
Mammoth to Norris	0.05	15	0.03	4.5	0.1	4	1.8	54	0.3	6	83.5
West Entrance to Madison	1.8	540	0.05	7.5	0.1	4	0.15	4.5	0.15	3	559
Madison to Norris	0.59	177	0.08	12	0.1	4	1.2	36	1	20	249
Norris to Canyon Village	0.44	132	0.05	7.5	0.2	8	0.56	16.8	0.7	14	178.3
Canyon Village to Fishing Bridge	0.34	102	0.45	67.5	1.4	56	0.36	10.8	0.7	14	250.3
Fishing Bridge to East Entrance	0.02	6	0.05	7.5	1.6	64	0.02	0.6	0.02	0.4	78.5
Fishing Bridge to West Thumb	0.08	24	0.46	69	0.3	12	0.02	0.6	0.7	14	119.6
Madison to Old Faithful	1.41	423	0.47	70.5	0.1	4	1.15	34.5	1.05	21	553
Old Faithful to West Thumb	0.27	81	1.35	202.5	0.2	8	0.05	1.5	0.75	15	308
West Thumb to Flagg Ranch	0.05	15	1.75	262.5	0.1	4	0.05	1.5	0.05	1	284

Snowcoaches	West Entrance 37		South Entrance 10		East Entrance 2		North Entrance 15		Old Faithful 19		Total 83
	Factor	Results	Factor	Results	Factor	Results	Factor	Results	Factor	Results	
YELL Road Segment											
Mammoth to Norris	0.05	1.85	0.03	0.3	0.1	0.2	1.8	27	0	0	29.35
West Entrance to Madison	1.8	66.6	0.05	0.5	0.1	0.2	0.15	2.25	0.48	9.12	78.67
Madison to Norris	0.59	21.83	0.08	0.8	0.1	0.2	1.2	18	0.06	1.14	41.97
Norris to Canyon Village	0.44	16.28	0.05	0.5	0.2	0.4	0.56	8.4	0.06	1.14	26.72
Canyon Village to Fishing Bridge	0.34	12.58	0.45	4.5	1.4	2.8	0.36	5.4	0.06	1.14	26.42
Fishing Bridge to East Entrance	0.02	0.74	0.05	0.5	1.6	3.2	0.02	0.3	0	0	4.74
Fishing Bridge to West Thumb	0.08	2.96	0.46	4.6	0.3	0.6	0.02	0.3	0.06	1.14	9.6
Madison to Old Faithful	1.41	52.17	0.47	4.7	0.1	0.2	1.15	17.25	0.6	11.4	85.72
Old Faithful to West Thumb	0.27	9.99	1.35	13.5	0.2	0.4	0.05	0.75	1.3	24.7	49.34
West Thumb to Flagg Ranch	0.05	1.85	1.75	17.5	0.1	0.2	0.05	0.75	1.18	22.42	42.72

Snowmobiles	CDST 50		Grassy Lake Rd 50		Jackson Lake 40		Totals 140
	Factor	Results	Factor	Results	Factor	Results	
GRTE Road Segment							
Moran Junction to Flagg Ranch	2	100	0	0	0	0	100
Flagg Ranch west to boundary	0	0	1.9	95	0	0	95
Jackson Lake fishing access	0	0	0	0	2	80	80

Note:

YELL group sizes are modeled at 90% 8 snowmobiles/group and 10% at 17 snowmobiles/group.